

segment for interlocking said seal portion and said body portion to integrate said composite sleeve seal as one integral component.

15. (New) A composite sleeve seal comprising:

a body portion including at least one collar section having at least one link segment extending therefrom; and

at least one seal portion disposed in axial prolongation with respect to said at least one collar section, said at least one seal portion being molded around at least a portion of said at least one link segment to interlock said at least one seal portion with said body portion to form said composite sleeve seal as one integral component.

Remarks

The Office Action of August 30, 2001, Paper No. 3, was carefully reviewed and to highlight the distinctions of the above referenced invention over the prior art of record as interpreted by the Examiner, the claims were amended as set forth herein. Claims 2-3 and 9-11 and 14 were amended herein; and Claim 15 was added to more broadly define Applicant's invention, since Applicant is entitled to claims as broad as the prior art and the disclosure will allow. No new matter was presented and such amendments are deemed unobjectionable. Entry thereof is respectfully requested. It is also respectfully requested that the Examiner reconsider the present application and claims as currently pending in view of the following remarks.

The Office Action set forth a restriction requirement under 35 U.S.C. §121 and presumably also under 37 CFR §§1.141 and 1.142 between Claims 1 through 13 as Group I, on the one hand, and Claim 14 as Group II, on the other. Applicant hereby traverses the restriction requirement under the authority of 37 CFR §1.143.

Notwithstanding the traversal, Applicant, as required in the Office Action, hereby provisionally elects the claims of Group I, namely, Claims 1 through 13, for further prosecution in this application.

Applicant's attorney, however, respectfully submits that the requirement for restriction is improper since the Examiner's suggested alternative method of manufacture is technically incorrect. As asserted by the Examiner, installing O-rings to the exterior and/or interior of the link segments would not, in fact, surround a link segment to interlock the seal portion and body portion. Accordingly, reconsideration and withdrawal of the requirement for restriction in this application are respectfully requested. Favorable action on all claims now pending in this application is likewise respectfully requested.

In the Office Action, the Examiner rejected Claims 1 through 13 under 35 U.S.C. §102(b) as being anticipated by Baron, U.S. Patent 6,260,851 (WO97/16670). The undersigned attorney respectfully traverses the Examiner's rejection of Claims 1 through 13 in view of the amendments presented herein and submitted herewith as well as the following argument for the reason that the claims are not anticipated by Baron.

The test for determining if a reference anticipates a claim, for purposes of a rejection under 35 U.S.C. §102, is whether the reference discloses all the elements of the claimed combination, or the mechanical equivalents thereof, functioning in substantially the same way to produce substantially the same results. As noted by the Court of Appeals of the Federal Circuit in *Lindemann Maschinenfabrick GmbH v. American Hoist and Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984), in evaluating the sufficiency of an anticipation rejection under 35 U.S.C. §102, the Court stated:

“Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.”

Applicant's independent Claims 1, 2, 8, and 15 all require:

1. A composite sleeve seal comprising:
 a body portion including at least one collar section having at least one *link segment* extending therefrom; and
 at least one *seal portion* contiguous with said at least one collar section and *surrounding said at least one link segment to interlock* said at least one seal portion with said body portion to form said composite sleeve seal as one integral component.
2. A composite sleeve seal for sealing a conduit connection, said composite sleeve seal comprising:
 a body portion including a plurality of collar sections spaced apart from one another to define at least one gap therebetween, said collar sections being interconnected by at least one *link segment* spanning said at least one gap; and
 at least one *seal portion* interposed said plurality of collar sections in said at least one gap and *surrounding said at least one link segment to interlock* said at least one seal portion with said body portion to form said composite sleeve seal as one integral component.
8. A fluid-tight conduit connection comprising:
 a female component;
 a male component positioned within said female component such that said female component circumscribes said male component; and
 a composite sleeve seal circumscribing said male component such that said composite sleeve seal is interposed said male and female components for sealing said fluid-tight conduit connection, said composite sleeve seal comprising:
 a body portion including a plurality of collar sections interconnected by at least one *link segment*; and
 at least one *seal portion* interposed said plurality of collar sections and *surrounding said at least one link segment to interlock* said at least one seal portion with said body portion to integrate said composite sleeve seal;

whereby said at least one seal portion is compressed by said male and said female components to primarily seal said fluid-tight conduit connection.

15. A composite sleeve seal comprising:
a *body portion* including at least one collar section having at least *one link segment* extending therefrom; and
at least one *seal portion* disposed in axial prolongation with respect to said at least one collar section, said at least one *seal portion being molded around at least a portion of said at least one link segment to interlock* said at least one seal portion with said *body portion* to form said composite sleeve seal as one integral component.

It is respectfully asserted that Baron fails to disclose each and every element of Applicant's independent claims. Specifically, Baron fails to disclose a composite seal having at least one link segment extending *from a body portion*. First, the "portions 47" in Baron are not link segments. Second, even if the "portions 47" in Baron are viewed as link segments, they do not extend from the body portion (ring 50). Rather, they extend from the O-ring (collar 42).

Additionally, Baron fails to disclose a composite seal having a seal portion surrounding the link segments of the body portion to interlock the seal portion to the body portion. First, the O-ring (collar 42) of Baron does not surround any part of the body portion (ring 50). At best, the O-ring of Baron axially prolongates the body portion of Baron, and perhaps covers a portion of the inside diameter of the body portion of Baron. Second, the O-ring of Baron is not interlocked to the body portion of Baron. At best, the O-ring of Baron is surface mounted to the body portion of Baron. Thus, Baron fails to disclose the composite seal as specifically claimed by Applicant.

Applicant's attorney cautions that the Baron reference confuses the terms ring and collar throughout the entire patent. For example, in the Baron abstract and the front page figure to which it pertains, the collar (6) is sleeve-like and composed of rigid material, and the ring (5) is an O-ring and is composed of elastomeric material. In contrast, the specification refers to Figure 5 in describing the collar (42) as a double O-ring that is composed of elastomeric material, and in describing the ring (50) as sleeve-like and composed of rigid material. Clearly, the terms ring and collar have been transposed and thus are confused in Baron. Nevertheless, Baron still fails to disclose the composite seal as specifically claimed by Applicant.

Based upon the above argument, Applicant respectfully submits that the Baron reference does not disclose each and every element arranged as in the claim of any of Applicant's independent claims. Therefore, in applying the test for anticipation as set forth above in *Lindemann*, Baron does not anticipate either independent Claim 1, 2, 8 or 15. Further, under principles of claim dependency, Baron does not anticipate any of the dependent claims either. Accordingly, reconsideration and withdrawal of the rejection of Claims 1 through 13 under 35 U.S.C. §102(b) is respectfully requested.

Applicant's attorney respectfully asserts that Applicant's invention is allowable also for the reason that Applicant's invention is not an obvious improvement over the prior art.

With respect to a rejection under 35 U.S.C. §103, it is noted in MPEP Section 706 that the standard of patentability to be followed in the examination of a patent application is that which was enunciated by the Supreme Court in *Graham v. John Deere*, 148 USPQ 459 (1966), where the Court stated:

“Under Section 103, the scope and the content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved.”

Accordingly, to establish a *prima facie* case of obviousness, the Patent Office must; (1) set forth the differences in the claim over the applied references; (2) set forth the proposed modification of the references which would be necessary to arrive at the claimed subject matter; and (3) explain why the proposed modifications would be obvious. To satisfy step (3) above, the Patent Office must identify where the prior art provides a motivating suggestion, inference or implication to make the modifications proposed in step (2) above. *In re Jones*, 21 USPQ2d 1941 (Fed. Cir. 1992). Prior to discussing the unobviousness of the present invention over the prior art, the problems, teachings, and disclosure of each of the Baron reference and Applicant's invention will be set forth, then the differences of the present invention over the prior art reference will be set forth.

Baron is directed to the problem of O-ring damage and the attendant difficulties in inserting a tubular connector having an O-ring into a connecting orifice. To overcome this problem, Baron teaches a composite gasket to be frictionally fit around a rigid tube end that is to be inserted into a cylindrical bore of a component. The gasket includes a rubber ring (or is it collar?) in the axial prolongation of a coaxial rigid collar (or is it ring?). The end of the collar that engages the ring in axial prolongation has a ring-engaging shape that is complementary to that of the ring.

Applicant's invention is directed to the problem in the prior art associated with machining O-ring grooves in the end of a tube and with poor sealability of tubular

connections. Applicant teaches a composite sleeve seal that can easily be slipped over the end of a tube and that provides a seal that is superior to that achievable with conventional O-rings disposed in grooves of a tube end. The composite sleeve seal includes at least one relatively rigid body portion that is collar-like in shape. Link segments integrally and axially extend from the body portion. A seal portion that looks like an O-ring is molded to the body portion so as to surround the link segments such that the seal portion interlocks with the body portion.

Clearly, there are significant differences between Applicants' invention and Baron. First, Baron teaches a conventional O-ring that is adhered to a cylindrical collar in axial prolongation of the collar. In contrast, Applicant teaches a seal portion that is molded to a rigid body portion around axially extending link segments that integrally extend from the rigid body portion. Thus, no adhesion process is needed. Second, each alternating collar and ring of Baron must be individually manufactured, resulting in an abundance of individual parts to be made, handled, and assembled together. Third, each alternating collar and ring must be adhered together, thus resulting in still more manufacturing steps. Fourth, due to the harsh environment in which such gaskets are used, an adhered connection between the collars and rings may separate. Consequently, the manufacture of the gasket is relatively time consuming and expensive, while performance of such an adhered thermoplastic in a demanding environment is not well established.

Therefore, Applicant asserts that Applicant's invention is unobvious for the following reasons. The differences between Applicant's invention and the prior art

references are quite clear, as set forth above. As set forth below, Applicant's invention yielded unexpected results in solving a general long-felt but unsolved need in the prior art.

Applicant solved a general long-felt but unsolved need in the prior art of sealing tubular connections. Reduction of part count, part complexity, and part costs as well as corresponding reduction in the manufacturing complexity of tubular connections is an ongoing need in this mature and competitive industry. Up until Applicant's invention, no one has recognized, much less suggested or used, an integrated composite sleeve to replace the classic groove and O-ring configuration for a tubular end-form. Applicant now provides a fluid-tight conduit connection that requires neither extensive tube nor seal manufacturing operations and that enhances the sealing capability of a tubular coupling. Therefore, Applicant's invention addresses and makes another significant step toward reduction of complexity of tubular connection design and manufacture.

Accordingly, Applicant's invention is an unobvious improvement over the prior art and not an obvious modification of any of the references of record in this application. When viewed singularly or collectively, none of the prior art references of record disclose, teach, or suggest an integrated composite sleeve seal for use with a tubular connection and, in fact, Applicant performs this for the first time. Reconsideration and withdrawal of the Examiner's rejections are, therefore, respectfully requested.

In view of the foregoing remarks, the undersigned attorney respectfully submits that the pending independent and dependent claims are in proper form, define patentably over the prior art, and are clearly allowable. Applicant's attorney, therefore, respectfully requests that the Examiner's rejections and/or restriction under 35 U.S.C.

§§102 and 121 be reconsidered and withdrawn and that a formal Notice of Allowance of the application be issued.

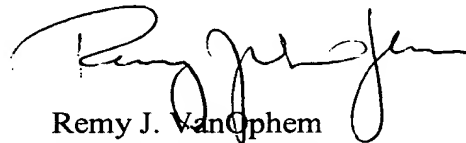
The prior art made of record but not relied on, namely Solberg, has been reviewed with interest. It is respectfully submitted that the present invention defines patentably thereover.

In accordance with 37 CFR §1.121, a clean copy of the claims as currently pending in the application, omitting all bracketed text and underlining, is included herewith as Exhibit A. Similarly, a clean copy of the amended paragraphs of the specification as pending in the application is included herewith as Exhibit B.

If the Examiner has any questions with respect to any matter now of record, Applicant's attorney may be reached at (248) 362-1210.

Respectfully submitted,

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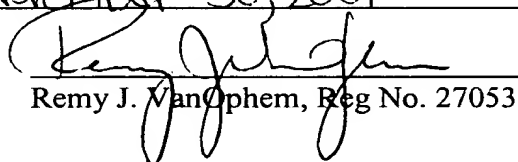
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Date: November 30, 2001



Remy J. VanOphem, Reg No. 27053

EXHIBIT A

2. A composite sleeve seal for sealing a conduit connection, said composite sleeve seal comprising:

a body portion including a plurality of collar sections spaced apart from one another to define at least one gap therebetween, said plurality of collar sections being interconnected by at least one link segment spanning said at least one gap; and

at least one seal portion interposed said plurality of collar sections in said at least one gap and surrounding said at least one link segment to interlock said at least one seal portion with said body portion to form said composite sleeve seal as one integral component.

3. A composite sleeve seal as claimed in claim 2 wherein said plurality of collar sections are made of plastic material and said at least one seal portion is made of rubber material.

9. A fluid-tight conduit connection as claimed in claim 8, wherein said at least one link segment comprises three link segments interconnecting each of said plurality of collar sections together.

10. A fluid-tight conduit connection as claimed in claim 9, wherein said three link segments extend axially between each of said plurality of collar sections.

11. A fluid-tight conduit connection as claimed in claim 10, wherein said three link segments are circumferentially spaced 120 degrees apart.

14. A method of manufacturing a composite sleeve seal comprising the steps of:

producing a body portion including at least one collar section
having at least one link segment extending from said at least one collar section;

placing said body portion in a mold cavity; and

injecting a seal portion into said mold cavity around said body
portion contiguous with said at least one collar section and around said at least one link
segment for interlocking said seal portion and said body portion to integrate said
composite sleeve seal as one integral component.

15. A composite sleeve seal comprising:

a body portion including at least one collar section having at least
one link segment extending therefrom; and

at least one seal portion disposed in axial prolongation with respect
to said at least one collar section, said at least one seal portion being molded around at
least a portion of said at least one link segment to interlock said at least one seal portion
with said body portion to form said composite sleeve seal as one integral component.

EXHIBIT B

Kindly amend the paragraph beginning on line 16 of page 4 as follows:

95 Another problem with conventional tube end-forming processes is side loading that can occur when the tubular connection is torqued. When the connection is torqued, the O-ring can become pinched in one area and decompressed in another area. The decompressed area of the O-ring becomes a leak path. Additionally, under side load conditions the O-ring is assured of failing when subjected to the harsh pressure, temperature, and vibration conditions of a vehicular air-conditioning system.

Kindly amend the paragraph beginning on line 1 of page 5 as follows:

96 One attempt at eliminating such end-forming operations was disclosed in U.S. Patent 4,781,400 to Cunningham. The Cunningham reference teaches a quick connect tube coupling using a two-piece tubular seal member placed over a male member for providing the effect of two O-rings, without requiring any special end-forming operation. Cunningham discloses the tubular seal member including a metal tubular member having a rubber material molded onto one end thereof. The tubular seal member is sandwiched between a male tubular member and a female tubular member. The rubber material includes inwardly extending beads and an axial portion for sealing axially against the female tubular member and for sealing radially against the male tubular member.

Kindly amend the paragraph beginning on line 11 of page 5 as follows:

97 While the Cunningham reference enables elimination of end-forming requirements for tubular connections, it has a few drawbacks. For example, the rubber material is not positively interlocked with the underlying metal tubular member and

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therefore may more easily become separated therefrom. Additionally, the rubber material seals only axially, and radially inwardly, which is quite unlike how traditional O-rings seal. Traditional O-rings seal both radially inwardly and outwardly, and thereby better center the male tubular fitting within the female fitting. Accordingly, with Cunningham there is no continuity of the rubber sealing surface from a radial surface on the male tubular fitting to a radial surface in the female tubular fitting.

Kindly amend the paragraph beginning on line 14 of page 13 as follows:

Q8
A secondary seal is established by the tapered portion 26 of the sleeve seal 20. The female connecting block 62 further includes a mounting surface 64, and includes the throughbore 66 extending through the female connecting block 62. The throughbore 66 includes a chamfer 68 in the mounting surface 64 where the chamfer 68 and throughbore 66 define a transition surface 70 therebetween. The transition surface 70 is essentially a ring formed from an annulus of intersecting points formed at the intersection of the chamfer 68 and throughbore 66. The tapered surface 28 of the tapered portion 26 of the sleeve seal 20 locates against the transition surface 70 of the female connecting block 62 such that the transition surface 70 engages in annular line contact against the tapered surface 28 to create a secondary seal of the fluid-tight block connection 10. This, in effect, forces the components on center thereby avoiding side-load types of failures.
